ENCLOSURE 4 - Form 2C Item V Data Notes

The 2C instructions require all analyses from all Outfall 005 and 006 sampling run during the past year and indicated EPA be considered. Analyses more than three years old are prohibited. The only older analyses used (in some attachments) were related to projects done to improve water quality. For 2C analyses also required on DMR, all values starting 7/2006 were considered. To assure DMR data was representative of discharge, all results were evaluated to determine if they were within three standard deviation (3 sigma) of the mean. Of the few results that exceeded 3 sigma from the mean, we excluded the two differing most from the mean. For Outfall 005, which receives offsite influent, this included: TOC (August 2006 and March 2008) and COD (March 2008). For Outfall 006 the results believed non-representative were: TSS (September 2006 and March 2007) and TOC (December 2006). We noticed that lime addition required to neutralize acidic influent from Intake 007 may result in unexpectedly high TOC and COD numbers.

We resampled Intake 007 (to 005) because zinc *grab* sample data collected during zinc source and minimization work for Outfall 905(005) had indicted results close to 0.400 mg/L (400 ug/L) are much more expected than the 0.228 mg/L we initially obtained when we composite-sampled 007 for Form 2C contaminants. The resample composite tested 0.475 mg/L. The resulting average is 0.352 mg/L, which we believe better represents typical Intake 007 water.

For calculating averages, nil values (any report as less than the laboratory QL) were considered to be zero. However, if the QL was higher than required by our permit for compliance monitoring, nil is reported as the QL value. All analyses done to meet DMR compliance requirements did meet permit QL criteria.

All analyses were done by 40 CFR Part 136. Aside from the 007 resampling mentioned above, the analyses, in addition to normal DMR data needed to complete Form 2C and the 1/5yr Water Quality Criteria (WQ) analyses, were taken with a large April DMR sampling. Samples for which there was one analysis were taken on April 8-9, 2009, an these are attached to the WQ report. All results that were DMR-reportable were reported on the DMR, and all analysis reports were attached to the WQ report.

Dioxin is not required. There are no sources. Expected absence was verified for the 2003 permit application. Method 625 scan was used; with a Result = nil. There are no radioactivity sources on plant except indoor EXIT signs and smoke detectors which are not exposed to water discharges. Because of this, radioactivity analysis is not required. Nevertheless, radioactivity was done for WQ analyses and indicated no radioactivity in our wastewater.

All loadings are calculated as indicated by permit: kg/d = concentration (mg/l) x flow (MGD) x 3.785. Where there is one analysis, the flow for the April 8-9, 2009, sampling was used. Otherwise, average mass was calculated using average of DMR reported flows, and maximum mass was calculated using the flow for the day the maximum concentration was obtained.

Nitrogen, total organic, mg/l = total Kjeldahl Nitrogen, mg/l minus Ammonia as N, mg/l.

ENCLOSURE 5 – Form 2F Item I - Outfall Locations

This permit application is for the two stormwater outfalls listed on Form 2F, Item I (905 and 906). Outfalls 001 and 002 also appeared in the 1999 VPDES Permit Application but are now addressed on Form 2C of this application. In 1999, DEQ removed stormwater monitoring requirements on Outfalls 001 and 002 from the permit requirements because the permitee had submitted evidence that industrial processes and storage facilities had been removed from the watershed areas feeding these outfalls. There continues to be no exposure to industrial activity in these watersheds.

There are a number of stormwater outfalls (including 010, 011, 012, 018, 019, 020, 022, 025, 027) that do not require permitting since no industrial activity is drained. A comprehensive list of stormwater outfalls/intakes is provided on the site drainage map (see Site Map #1 – Storm Drainage System). The location and drainage area of all stormwater outfalls/intakes (except some internal outfalls) is shown on Site Map #1.

Since 1993, DEQ water permit staff has conducted several site inspections to establish and verify stormwater permitting requirements for Hercules. In October 1993, J. R. Bell and Chip Ray conducted a thorough field inspection of the Hercules Plant site to determine which outfalls require a stormwater permit. The three stormwater outfalls included on Form 2F, Item I (plus 001 and 002) are consistent with the recommendations made by J. R. Bell and Chip Ray during their October 1993 site inspection. Subsequent site inspections by water permit engineers Kyle Winter (three inspections: 1995, 1996, and June 1997) and James Golden (one inspection – October 1997) confirmed that no additional outfalls required permitting. At the time of these inspections, removal of idle assets on the western side of the plant was being completed. Operations on the west side of the plant, except some warehouse storage, had been discontinued before or during 1989. Since about 2000, the warehouse storage has involved no outside loading or unloading. In about 2003, the sole warehouse in Outfall 001 drainage area was cleared and its firewater service discontinued.

With the current permit application, we request removal of monitoring requirements at Outfall 013 since there has been no 013 discharge for over ten years - including Hurricanes Floyd and Isabel, as well as Tropical Storm Gaston. Outfall 013 is the overflow pipe for a sediment basin for our inert debris fill. This construction fill receives a few truck loads of clean soil, gravel, and broken concrete per year. Since the area has become well vegetated under our SWPP/BMP plan, there is no longer any overflow (discharge). We do not expect there ever will be discharge here because vegetation of the area has continued to improve during this period. Continued maintenance of the sampling station that (for lack of sampling events) is no longer used is hazardous because of uneven rocky slopes that are well vegetated

ENCLOSURE 6 – Form 2F, ITEM IV-A, B, C

ITEM IV-A. Outfall Drainage Areas

	A	B	C	D
Outfall No.	Total Drainage Basin Area ($ft.^2$) (from Site Map #1)	% of Area Drained to Outfall (Remainder Goes to Industrial Sewer)	Total Area (ft^2) Drained to Outfall (C = A * B)	Area (ft^2) of Impervious Surface Drained to Outfall
905	1,689,000	90	1,520,000	760,000
906	1,732,000[(1)]	90	1,559,000[(1)]	265,000[(1)]

[(1)]Includes the drainage area for internal Outfall 601 since it overflows to Outfall 906.

ITEM IV-B. Description of Pollutant Sources

To a considerable extent, the areas with industrial activities have been isolated from stormwater contact by a concerted plant sewer system rerouting and upgrade effort that intensified during the 1980's. The isolation of the industrial activities from stormwater is accomplished by routing the stormwater from process, storage, and transfer areas to the industrial sewer system. For example, the plant's secondary containment/diking systems for SARA 313 chemicals are drained solely to the industrial sewer system (with the exception of two dikes for the ethylene oxide (EO) and propylene oxide (PO) storage tanks, which are drained to Outfall 006). EO and PO tanks are under roof, and dike waters are tested to assure absence of EO and PO prior to discharging waters to 006. Consequently, stormwater drained from storage tank dikes does not come into contact with stormwater in the stormsewer system. The plant's extensive industrial sewer system is shown on Site Map #2. In addition, chemical storage, loading, and unloading areas are shown on Site Map #2.

For outfalls included in this application, there are a number of potential sources of pollution that might contact stormwater. These sources include the following:

- Overhead Piping: There are pipe racks located in the drainage areas for Outfalls 905 and 906 (including 601). As a result, there is the potential for a pipe leak to result in stormwater contamination. The probability of this being a significant source of pollutants is minimized by the fact that any leak is readily detectable when the piping is above ground. Additionally, operating personnel routinely inspect the pipe racks and equipment such as pumps.
- Unloading/Loading Areas: There are a number of transfer areas at which chemicals are unloaded or loaded (see Site Map #2). The probability of this being a significant source of pollutants is minimized by the use of strict procedures and the fact that most of these areas drain to the industrial sewer.
- Internal Outfall 601 drain areas potentially affected by industrial activity and dry weather flows to its collection station are pumped to the industrial sewer system which discharges to the Hopewell Regional Wastewater Treatment Facility. More significant rain events may cause brief overflow at 601 to Outfall 006/906.
- Inert Debris Fill (Outfall 013): This was described in previous applications but is no longer applicable because there is no discharge.
- Herbicide (glyphosate, active ingredient in Roundup.) is occasionally applied by a licensed contractor to control brush growth in areas that require access. Fertilizers are generally not used.

Significant Materials

Under SIC Code 2869, the Hercules facility is involved in the manufacture of carboxymethylcellulose (CMC), hydroxyethylcellulose (Natrosol®), hydroxypropylcellulose (Klucel®), ethylcellulose (EC), fluidized polymer suspension (FPS), and monochloroacetic acid (MCA).

Significant materials include raw materials, intermediate products, final products, waste materials, and by-products. A list of significant materials (by process manufacturing area) used at the Hercules facility is contained in the following table:

Process Area	Significant Materials
CMC / FPS	cellulose, acetic acid, alkali cellulose, hydrogen peroxide, isopropyl alcohol, chloroacetic acid, sodium acetate, sodium chloride, sodium glycolate, sodium hydroxide, ammonia, tall oil, mineral oil
EC / MCA	cellulose, acetic acid, alkali cellulose, diethyl ether, ethyl alcohol, ethyl chloride, ethylene glycol, hydrochloric acid, sodium hypochlorite, monochloroacetic acid, sodium acetate, sodium chloride, sodium hydroxide. (Discontinued use of chlorine and acetic anhydride-2004).
Klucel	cellulose, acetic acid, alkali cellulose, heptane, hydrogen peroxide, nitric acid, propylene oxide, propylene glycol (and polypropylene glycols, sodium acetate, sodium glycolate, sodium chloride, sodium hydroxide, tertiary butyl alcohol
Natrosol	cellulose, acetic acid, acetone, alkali cellulose, diacetone alcohol, ethylene glycol (and polyethylene glycols), ethylene oxide, hydrogen peroxide, isopropyl alcohol, chloroacetic acid, nitric acid, sodium acetate, sodium glycolate, sodium hydroxide, tertiary butyl alcohol, sulfuric acid, n-butylglycidyl ether

ITEM IV-C. Description of Stormwater Control Measures

There are both structural and non-structural stormwater control measures employed at the Hercules facility. Structural stormwater control measures in drainage areas for outfalls are detailed in a combined Surface Water Protection / Best Management Practices Plan (SWPP/BMP), as updated in 2006. These control measures include:

- Secondary containment berms around all major storage tanks.
- Diversion of stormwater from process areas to the industrial sewer.
- Numerous roofed storage areas.

Non-structural stormwater controls employed at the Hercules facility include:

- Surface Water Protection Plan.
- Oil Discharge Contingency Plan.
- Spill Prevention Control and Countermeasures Plan.
- Secondary containment upgrade program for tank storage areas.
- Plant programs to encourage good safety and housekeeping practices.
- Preventative maintenance programs.
- Frequent visual inspections of chemical storage and transfer areas by plant operators.
- Plant procedures that require a review and analysis of environmental and safety incidents.
- Leak detection and repair program catches leaks still in vapor phase.

ENCLOSURE 7 - Form 2F Item V-B

In accordance with current VPDES permit (Part I.A.22) requirements, there are no dry weather flows at Outfall 601. Review of the facility and existing site plans, drainage plans, and utility plans confirmed there are no plant floor drains, process wastewater systems, or sanitary systems draining to the outfalls covered by this application.

Routine field inspections conducted during non-storm periods are used to verify there is no flow at these locations. (Continuous non-stormwater discharge at the Outfall 906 and 906 locations is characterized as described in Form 2C of this application as continuous Outfalls 005 and 006, respectively.)

ENCLOSURE 8 - Form 2F, Item VII
Data Notes/Sampling Logic

Under its current permit, Hercules samples Outfalls 905 and 906 quarterly and semiannually. Grab samples are prescribed; therefore, most available data are on grab samples. In June 2009, we conducted grab sampling (per permit and 2F instructions). This additional sampling was done primarily to obtain composite values for 2F section VII-B, which requires analyses for effluent guidelines or each pollutant listed in the facility's permit. Our analyte list included each contaminant analyte listed in the facility's permit for each outfall. We considered analytes analyzed under prior permits and applications. We reviewed Tables F-2, F-3, or F-4 for chemicals used at the site (such as chloroethane) and for chemicals included in materials used on the site (such as ethylbenzene, assumed to be in gasoline).

Though not required, hardness was determined to allow proper evaluation of any required dissolved metals. Ammonia was done to enable calculation of total organic nitrogen in VIIA.

Of the potential pollutants used on the plant, the only pollutant exposed to stormwater is zinc from city water. Chlorine and chloroform potentially present in city water are not detected in dry weather flows to Outfalls 005 and 006 and would thus not be logically suspected in rain events where flow is much diluted by rain water. Other pollutants are not expected because effective Surface Water Protection Plan / Best Management Practices Plan (SWPP/BMP) prevents pollutants from potentially intercepting rain water that flows to outfalls. Moreover, these plans minimize groundwater contamination that could in turn affect streams and outfalls.

All DMR values starting in September 2006 were considered for Form 2F. The 2F instructions require that data presented be representative and less than three years old. We have sampled at least quarterly under conditions that represent the range of rain events typical to the area. All results are believed to be representative and none were excluded. As for 005 and 006, we did calculate 3 sigmas and would have excluded any more than 3s from average – there were none for 905 and 906.

Analyses were done by 40 CFR Part 136. The exception is propylene oxide (PO) for which there is no approved EPA wastewater method. PO is analyzed by an in-house GC-FID method. For calculating averages, "nil" values (any report as less than the laboratory QL) are considered to be 0. We would have reported any nils not meeting the QL indicated in the permit as the QL value, but there were none.